lows have been sufficiently defined to be charted on Maps I and II. Each line on these maps shows the apparent path of the high or low.

It is not intended to convey the idea that there has been any actual motion of air particles along these lines. It is probable that the action is more like that seen when a wave of the ocean approaches the coast. In this case it is known that, though there is an appearance of water sweeping on toward the land, there is in reality no forward motion of water, but at each moment there is a mass of water moving up and down in a nearly vertical direction. There may be a transferrence of the cause or force producing the high or low in the atmosphere and the effect upon the air be entirely secondary without any motion of air particles. At a height of about 6,000 feet there is nearly a constant motion of air currents from a westerly direction, or, at least, toward a direction not coinciding with the apparent path of the high or low, and it must be admitted that this motion of air currents is independent of that of the high or low.

It is extremely difficult to locate the place of origin of this force which produces our highs and lows, but it must be above our highest mountains, for the changes in pressure on the apparent approach of a high or low toward a mountain are the same as those at the base of the mountain when we allow for the less density of the air at the mountain summit. It has also been shown that the change in temperature at the summit of Mount Washington occurs about eleven hours earlier than at the base as a high or low approaches it. This is an extremely significant fact and seems to show that the source of this heat, in part at least, is above the summits of our mountains.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	1, a.m.	52	116	8, p.m.	36	77	3,836	7.5	510	21.3
II	8, a.m.	53	111	14, a.m.	32	78	2,490	6.0	415	17.3
III	11, a.m.	42	126	18, a.m.	39	81	3,234	7.0	462	19.2
IV	17, a.m.	52	106	20, p.m.	42	85	1,950	3.5	557	23.2
V	21, p.m.	51	87	24, p.m.	44	59	1,632	3.0	544	22.7
VI	21, p.m.	47	127	24, a.m.	34	101	2,034	2.5	814	33.9
VII	25, a.m.	46	127	27, a.m.	39	98	1,818	2.0	909	37.9
VIII	28, a.m.	52	116	31, p.m.	38	76	2,160	3.5	617	25.7
Total							19,144	35.0	4,828	
Mean of 8 tracks							2,393		604	25.2
Mean of 35 days									547	22.8
Low areas.										
I	[1]	51	122	5, a.m.	41	71	3,252	6.0	542	22.6
II	[2]	53	118	13, a.m.	47	63	3,383	8.5	398	16.6
III	8, a.m.	46	117	17, p.m.	51	66	3,562	9.5	575	15.6
IV	18, p.m.	48	81	20, p.m.	49	64	980	2.0	490	20.4
V	20, p.m.	41	99	24, a.m.	40	74	1,687	3.5	482	20.1
VI	21, a.m.	52	120	26, a.m.	49	65	3,040	5.0	608	25.3
VII	23, p.m.	53	115	28, a.m.	47	67	2,380	4.5	529	22.0
VIII	27, p.m.	47	105	30, p.m.	49	60	2,220	3.0	740	30.8
IX	29, p.m.	53	118	[3]	42	98	1,500	2.5	600	25.0
Total							22,004	44.5	4,764	
Mean of 9 tracks							2,445		529	22.0
Mean of 44.5 days									492	20.5

In the column showing length of track the figures are only approximate and should be considered only to the nearest 10 miles.
[1] July 30, a. m.
[2] August 4, p. m.
[3] September, 1 a. m.

A study has been made of the place of first and last appearance, as well as of the length of their apparent paths and of their apparent velocity, and these studies are embodied in the accompanying table. The following remarks are added:

HIGHS.

The general tendency of the high areas of August has been along the parallel of about 40°, from the Rocky Mountains to the Atlantic. Their origin, however, may be traced in all but one case, which began over Lake Superior, either off the Pacific Coast or to the north of Montana. Five could be traced to the Atlantic Coast; one was last noted in Texas and two disappeared or mingled with a rather permanent high near the Middle Atlantic States.

LOWS.

The lows began, as just noted for the highs, in most cases to the north of Montana or near there. One was first noted in Nebraska and another in Ontario. The apparent motion of these lows was along the Great Lakes or along the parallels of 47° or 48°, or about 500 miles north of the general trajectory of the highs. Six of these lows were last noted in the Gulf of St. Lawrence, two off the middle Atlantic coast, and one in Iowa.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperatures and the departures from the normal, as determined from records of the maximum and minimum thermometers, are given in Table I for the regular stations of the Weather Bureau, which also gives the height of the thermometers above the ground at each station. The mean temperature is given for each station in Table II, for voluntary observers.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II. The mean temperatures given in Table III for Canadian stations are the simple means of 8 a. m. and 8 p. m. simultaneous observations.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution of the observed monthly mean* temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the Rocky Mountain Plateau region, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean temperatures* at regular stations were: In the United States, Yuma, 91.9; Phœnix, 89.2; Key West, 83.8; Galveston, 82.8. In Canada, Kamloops, 70.6; Medicine Hat, 67.2. The *lowest* were: In the United States, Point Reyes Light, 55.9; Eureka and Tatoosh Island, 56.5; San Francisco, 57.6. In Canada, Banff, 53.8; Father Point, 54.4; White River, 55.1.

As compared with the normal for August, the mean temperature for the current month was deficient in most of New England and the Lake Region, but in excess in the Rocky Mountain and Pacific Coast regions.

The greatest excesses were: In the United States, Portland, Oreg., 5.1; Winnemucca, 4.1; Spokane, 3.9; Baker City, 3.7; Roseburg, 3.6. In Canada, Medicine Hat, 1.5; Edmonton, 1.4. The greatest deficits were: In the United States, Yankton and Sioux City, 3.4; Huron, 3.2; El Paso, 2.7. In Canada, Rockliffe, 3.4; Montreal, 3.0.

Considered by districts the mean temperatures of the current month show departures from the normal as given in Table I. The greatest positive departures were: West Gulf, 0.7; Middle Plateau, 2.2; Northern Plateau, 2.8; North Pacific, 2.4, The greatest negative departures were: Lower Lake, 1.1; North Dakota, 0.8; upper Mississippi, 0.9; Missouri Valley, 1.3.

In Canada, Prof. R. F. Stupart says:

The temperature has been above the average by about 2° and 4° over the greater part of British Columbia and the Northwest Territories, and just above average in Manitoba, and thence eastward to Algoma and Nipissing; over the Peninsula of Ontario it has been below by between 2° and 4°, and in the Province of Quebec by from 0° to 2°.

The *years of highest and lowest mean temperatures* for August are shown in Table I of the REVIEW for August, 1894. The mean temperature for the current month was the highest on record at: Port Angeles, 60.1; Carson City, 69.7; Baker City, 70.0; Roseburg, 70.4; Portland, Oreg., 71.1; Spokane, 72.2; Walla Walla, 76.8. It was the lowest on record at: Sioux City, 68.2.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: Yuma, 112; Phœnix, 110; Red Bluff, 109; Fresno, 108; Topeka and Shreveport, 105; Walla Walla and Palestine, 104; Sacramento and Fort Smith, 103. The lowest maxima were: Block Island and Nantucket, 77; Point Reyes Light, 71; San Francisco and Eureka, 70; Tatoosh Island, 68. The highest minima were: Phœnix and Corpus Christi, 73; Galveston, New Orleans, Key West, Jupiter, and Charleston, 71; Pensacola and Tampa, 70; Yuma and Mobile, 69. The lowest minima were: Winnemucca, 36; Carson City, 37; Havre, 38; Moorhead, 39; Williston, Huron, Marquette, and Northfield, 30.

The *years of highest maximum and lowest minimum temperatures* for August are given in the last four columns of Table I of the REVIEW for August, 1896. During the current month the maxima temperatures were equal to or above the highest on record at: Carson City, 95; Atlanta, 96; Pensacola, 97; New Orleans, 99; Mobile, 101; Palestine, 104. The minimum temperatures were not below previous records at any Weather Bureau station.

The *greatest daily range of temperature and the data for computing the extreme and mean monthly ranges* are given for each of the regular Weather Bureau stations in Table I. The largest values of the greatest daily ranges were: Winnemucca and Idaho Falls, 47; Sacramento, Carson City, and Pierre, 44. The smallest values were: Hatteras, 11; Corpus Christi, 14; Block Island, 15; Galveston, Jupiter, and Nantucket, 17.

Among the *extreme monthly ranges* the largest were: Winnemucca, 62; Havre, 59; Carson City, 58; Williston, 57. The smallest were: Corpus Christi, Hatteras, and Nantucket, 18; Key West and Block Island, 20; San Francisco, 21; Tatoosh Island, 22.

Accumulated monthly departures from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal condition.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
New England	+ 3.8	+ 0.5	Florida Peninsula	0.0	0.0
Middle Atlantic	+ 0.9	+ 0.1	Southern Slope	0.0	0.0
South Atlantic	+ 1.3	+ 0.2			
East Gulf	+ 1.8	+ 0.2			
West Gulf	+ 6.9	+ 0.9	Ohio Valley and Tenn.	− 0.9	− 0.1
Lower Lake	+ 2.5	+ 0.3	North Dakota	− 5.8	− 0.7
Upper Lake	+ 8.9	+ 1.1	Northern Slope	− 2.1	− 0.3
Upper Mississippi Valley	+ 1.7	+ 0.2	Southern Plateau	− 6.4	− 0.8
Missouri Valley	+ 0.8	+ 0.1	Middle Plateau	− 5.8	− 0.7
Middle Slope	+ 3.0	+ 0.4	Middle Pacific	− 2.0	− 0.2
Northern Plateau	+ 8.2	+ 1.0	South Pacific	− 4.3	− 0.5
North Pacific	+ 1.2	+ 0.2			

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight of the vapor coexisting with the air contained in a cubic foot of space, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-point for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, is given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer. The mean wet-bulb temperature is now published in Table I; it is always intermediate, and generally about half way between the temperature of the air and of the dew-point. The quantity of water evaporated in a unit of time from the muslin surface may be considered as depending essentially upon the wet-bulb temperature, the dew-point, and the wind.

The *relative humidity*, or the ratio between the moisture that is present in the air and the moisture that it would contain if saturated at its observed temperature is given in Table I as deduced from the 8 a. m. and 8 p. m. observations. The general average for a whole day, or any other interval, would properly be obtained from the data given by an evaporometer, but may also be obtained, approximately, from frequent observations of the relative humidity.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was largest, exceeding 10 inches, in southern Mississippi, Alabama, and northwestern Florida. In general it was less than 4 inches; little or none fell at Rocky Mountain, Oregon, and California stations; regions of from 3 to 5 inches occurred in eastern Arizona and western Texas. The larger values for regular stations were: Mobile, 11.56; Tampa, 7.84; Charleston, 7.34; Narragansett Pier, 6.05; Jupiter, 6.85. In Canada, Bermuda, 7.40.

Details as to *excessive precipitation* are given in Tables XI and XII.

The *diurnal variation*, as shown by tables of hourly means of the total precipitation, deduced from the self-registering gauges kept at the regular stations of the Weather Bureau, is not now tabulated.

The *current departures* from the normal precipitation are given in Table I, which shows that precipitation was in excess in portions of Alabama, Georgia, South Carolina, eastern Tennessee, and southern Florida, but elsewhere generally deficient. The large excesses were: August, 5.2; Mobile, 4.7; Montgomery, 2.4; Fort Smith, 2.2. The large deficits were: Raleigh, 6.0; Kittyhawk, 5.5; Cape Henry and Wilmington, 4.0.

The *average departure* for each district is given in Table I. By dividing each current precipitation by its respective normal the following corresponding percentages are obtained (precipitation is in excess when the percentage of the normal exceeds 100):

Above the normal: Florida Peninsula, 111; East Gulf, 103; southern Plateau, 107; Northern Plateau, 131.

Normal: northern Slope, middle Pacific, and southern Pacific.

Below the normal: New England, 98; middle Atlantic, 63; south Atlantic, 77; west Gulf, 83; Ohio Valley and Tennessee, 64; lower Lake, 86; upper Lake, 83; North Dakota, 66; upper Mississippi, 57; Missouri Valley, 70; middle Slope, 92; southern Slope, 79; middle Plateau, 71; north Pacific, 90.

In Canada, Prof. R. F. Stupart says:

The rainfall was nearly average over the greater portion of the Dominion. The only districts in which there was any marked departure above were those lying north and west of Lake Superior and near the Georgian Bay, and the only marked deficiency occurred in the upper St. Lawrence Valley, where the amount was just about half the average.

The *years of greatest and least precipitation* for August are